



FACT SHEET

What is radiation?

Radiation is a form of energy, similar to light energy. It is naturally present in the earth's materials and the food we eat, and from outer space, such as rays from the sun. Most of our exposure to radiation (80%) comes from these natural sources. The other 20% comes from man-made radiation sources, mainly from medical use such as x-rays, diagnostic tests, and cancer treatments. Radiation has the same effect on the body regardless of whether or not the source is natural or man-made.

Are there different types of radiation incidents?

Yes. The main difference is that some radiation incidents can involve a **nuclear reaction**. A nuclear reaction is a type of chemical reaction involving radioactive materials that release tremendous amounts of energy. These incidents, like those that occurred in Hiroshima and Nagasaki during World War II, involve a powerful nuclear reaction called fission, which is thousands of times stronger than the explosion of a conventional bomb.

A **dirty bomb** is a type of non-nuclear radiation incident. A dirty bomb, or radiological dispersion device (RDD), is a bomb that combines common explosives, such as dynamite, with radioactive materials, possibly in the form of powder or pellets. When the dirty bomb explodes, radioactive material is blasted into the area around the explosion. Specks of this material might float in the air or fall on surfaces such as streets, cars, roofs, or people. This could cause people and buildings to be exposed to radioactive material, though the amount of radiation would likely be low. The greatest danger from a dirty bomb is the blast itself. While people in the immediate area of the explosion could be harmed from the explosion, the main purpose of a dirty bomb is to cause widespread fear and make buildings or land unusable for a long period of time.

What are the health effects of radiation exposure?

People are exposed to low levels of radiation every day from the natural "background" radiation found in the environment and from man-made sources. Low levels of radiation do not cause any detectable harm.

Exposure to higher levels of radiation, however, can affect the body in a number of harmful ways, and these damaging effects may not be seen for



many years. The severity of the effects depends on the amount of radiation absorbed by the body, the type of radiation, how the radiation is taken into the body (breathed in, eaten, or absorbed through cuts in the skin), the length of time a person is exposed, and how fast the person is exposed.

Exposure to above-normal levels of radiation can lead to fatigue, nausea and vomiting, and changes in the blood. It can also increase the risk of developing cancer much later in life. Exposure to very large doses of radiation can lead to radiation sickness, with symptoms such as loss of appetite, hair loss, diarrhea, or even death.

What steps can Houstonians take to prepare for a radiological/nuclear emergency?

Emergency management officials recommend an "all-hazards" approach to emergency preparedness, which means that one plan can be used for several kinds of emergencies. Creating a household disaster plan, assembling an emergency supply kit, and putting together a bag of supplies you can grab on the go (a "go-bag") will provide you with the tools you need for almost any emergency, including a radiological incident. For more information on developing family disaster plans or assembling emergency supply kits, visit **READYAmerica** at <http://www.ready.gov/america/index.html>.

The City of Houston Department of Health and Human Services, along with other government agencies and health institutions, will do everything possible to protect the health of all persons who live, work, or are visiting in Houston. During any public health emergency, health officials will provide instructions through TV and radio on how best to protect yourself and your loved ones. If a nuclear or radiation emergency does occur in Houston, stay tuned to the news media. Do NOT immediately rush to hospital emergency rooms. You may not be in immediate danger, and hospitals have to treat those who need immediate care. Furthermore, many treatments will be provided in non-hospital settings (emergency clinics) that would be established in multiple locations throughout the city.

How can I protect myself from exposure to radiation if a radiological incident occurs?

The three basic ways to protect yourself against exposure are:

- **Time:** The longer you spend around a source of radiation, the more you are exposed. If you decrease the amount of time you spend near a



NUCLEAR AND RADIATION INCIDENTS

source of radiation, you will decrease the amount of radiation exposure you receive.

- **Distance:** The farther away you are from a radiation source, the less exposure you will receive. The closer you are to the source, the greater the chances of damage to your body. If you increase your distance from the source, your exposure will be much lower.
- **Shielding:** Increasing the shielding between yourself and a radiation source (with protective barriers such as walls and buildings) will decrease your exposure. Depending on the type of radioactivity (the most common types are alpha, beta, and gamma), effective shielding could be as thin as a piece of paper (for alpha radiation) or as thick as a lead-lined wall (for gamma radiation).

What should I do if a nuclear or radiological incident occurs?

As mentioned above, the key to safety in any public health emergency is to pay attention to local radio and TV broadcasts for information. Until instructions from City or State officials are issued through such broadcasts, please take the following precautions:

- Remain inside, keep the windows closed, and minimize the opening of doors to the outside.
- If you are outside, find shelter in the nearest building.
- Turn off fans, air conditioners, and forced-air heating units that bring in fresh air from the outside. Use these only to circulate indoor air.
- Do not allow children to play outdoors.
- Do not eat any fruit or vegetables grown in an area directly affected by radiation fallout (radioactive particles that may settle on the ground). This is unlikely in the event of an incident occurring in Houston. Furthermore, if foods in the area are affected, government officials will provide uncontaminated food and water.
- If you must go outside for lifesaving activities, cover your nose and mouth and avoid stirring up or breathing in dust as much as possible.

What should I do during a nuclear or radiological incident?

- If there is a flash or fireball, do not look at it - it may cause blindness.
- If you hear an attack warning:
 - Take shelter in a room with few doors and windows, and stay there unless instructed to do otherwise.
 - If you are caught outside, and are unable to get inside immediately, take cover behind anything that might offer protection. Lie flat on the ground and cover your head.



- Keep a battery-powered radio on hand so that you can listen for official information during an emergency. Follow the instructions given by local officials.

What should I do in the period after a nuclear or radiological incident has occurred?

Contamination from a radiological incident could affect a wide area, depending on the quantity of radioactive material and weather conditions. In the case of widespread contamination, people in most of the affected areas may need to be evacuated. However, it is important not to try to leave the area or your place of shelter until City or State officials tell you that it's safe to do so. Follow their instructions when leaving.

If you are told to remain in shelter at your home, office, or a public shelter, here are some things to keep in mind:

- Although it may be difficult, you should make every effort to maintain sanitary conditions in your shelter space.
- Water and food may be scarce. Use them carefully, but do not impose severe rationing, especially for children, the ill, or the elderly.
- Cooperate with each other. Living with many people in a confined space can be difficult and stressful.
- If you turned the gas, water, and electricity off at the main valves and switch before you took shelter:
 - Do not turn the gas back on. The gas company will turn it back on for you or you will receive other instructions.
 - Do not turn the water back on at the main valve until you know the water system is working and water is not contaminated.
 - Do not turn electricity back on at the main switch until you know the wiring is undamaged in your home and the community electrical system is functioning.
 - Check to see that sewage lines are intact before flushing toilets.

During the period after a radiological/nuclear incident, it is important to stay away from damaged areas and areas marked "radiation hazard" or "HAZMAT" (short for hazardous material).

What is potassium iodide (KI), and what does it have to do with radiation?

Potassium iodide is a salt, similar to table salt. It can be used to help protect your thyroid gland from harmful radioactive iodine if there is a radiological emergency occurring from a nuclear power plant or, much less likely, from a



nuclear device. KI does not protect any part of the body other than the thyroid from radiation; nor does it protect against any radioactive substances other than radioactive iodine. It is only effective when radioactive iodine is present, which likely would not be the case in an attack involving a dirty bomb.

If a nuclear power plant incident occurs and radioactive iodine is released into the air, only people in the affected area - and only when radioactive iodine exposures reach certain levels - will be instructed by City and State officials to take KI.

What if fears about terrorism are having a serious impact on my family and work life?

After the events of September 11th, 2001, it is reasonable for individuals to feel anxious about their personal safety. However, if anxiety stops you from doing things that you would normally do, it might be helpful to speak with a professional counselor. Your healthcare provider can make a referral, or you can get help by calling Crisis Hotline at 713-HOTLINE (468-5463 - English) or 713-526-8088 (Spanish), or United Way Help Line at 211.

Additional information can be found at:

- **U.S. Centers for Disease Control and Prevention**
<http://www.bt.cdc.gov/>
- **Agency for Toxic Substances and Disease Registry**
<http://www.atsdr.cdc.gov/>